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- ART. VI.—1. *The Aquarium, an Unveiling of the Wonders of the Deep Sea.* By PHILIP HENRY GOSSE, A. L. S., etc. London: John Van Voorst. 1855.
2. *The Book of the Aquarium and Water Cabinet.* By SHIRLEY HIBBERD. London: Groombridge and Sons. 1856.

“THERE is something positively agreeable,” says Lord Brougham, “in gaining knowledge for its own sake. There is also a pleasure in seeing the uses to which knowledge may be applied; and it is another gratification to extend our inquiries, and find that they are useful to man, though we have no chance ourselves of ever benefiting by the information.” No class of men seem so habitually to act up to this aphorism as the true devotees of natural science. Witness their untiring zeal, their unremitting exertions, to add one leaf to the tree of knowledge, which may be likened to those coral groves, growing by the slow accretion of ages, as the tiny zoöphyte year by year deposits its secretions, until myriads of separate individuals, bound together in one object, and constituting a grand united whole, form a fitting temple to the glory of the Eternal Architect.

“When Science from Creation’s face  
Enchantment’s veil withdraws,  
What lovely visions yield their place  
To cold material laws ! ”

So sang the poet in the early part of this century. Had he lived in our day, naturalists would indict him for a libel against “fair Science,” and show him such wonders in nature as would make him acknowledge that the visions of imagination grow dim, when compared with the sober facts they can substantiate

“Who enter into Nature’s holy place,  
Her inner temple, and behold her face  
Unveiled.”

Each succeeding year presents to us fresh achievements in natural history. Patient research, aided by the magical revelations of the microscope, has opened up unexplored realms,

and a new world, rising, like the old, from Father Ocean, stands revealed in pristine beauty to our wondering eyes.

To the old Romans, an *aquarium* signified only a reservoir of water. Gardeners have applied the same name to the tanks in which they cultivate the *Victoria regia*, and other aquatic plants; but at the present time the word is understood in a more extended sense, and the article itself has grown into such favor that the whole English world has gone wild upon the subject, and we, as in duty bound, appear to have taken the disease in the natural manner. It were well if all the freaks of Fashion were as innocent and interesting as this; and when for once she has taken a scientific turn, and lends her potent charms to search for truth at the bottom of the well, let us applaud her wisdom while we can, and analyze this Cynthia of the minute ere she turns to some new whim.

The numerous works upon the aquarium which have been issued from the English press during the last few years, have served as a Claude-Lorraine glass to invest with new and wondrous light the common objects of the sea-shore. As the best of these volumes, for comprehensive practical knowledge and beauty of execution, we would recommend those whose titles stand at the head of this article. These popular treatises upon the inhabitants of the ocean have established an era in its organic life. They have not, it is true, put forth any new theory; for, as long ago as Priestley and Ingenhousz, it was proved that plants and animals preserved the equilibrium of the atmosphere; but the successful working out of this established fact has resulted in the beautiful object to which has been given the name of *Aquarium*, or, more correctly speaking, *Aqua-vivarium*. This, as the name implies, is no gloomy mausoleum, but a living, moving world. The naturalist, instead of collecting his specimens for the cabinet and the herbarium, takes them from their watery home, and restores them again to their native element, only with new surroundings, where he can at leisure watch their habits and growth.

As is usually the case with all popular inventions, there are many claimants for the honor of having made the first aquarium. It is easy to see how scientific research into the

mysteries of the ocean, replete with life, so little known and still less understood, should lead its votaries in different lands to form similar plans for rendering this microcosm accessible to their own and other eyes. Probably the ball was put in motion by Mr. Ward's successful experiments in keeping plants in the closed glass cases which bear his name; for he stated, at a meeting of the British Association at Oxford in 1849, that he had succeeded in growing sea-weeds not only in sea-water, but in sea-water artificially prepared. The cages made by Mrs. Power, a learned French lady residing in Messina, in 1832, although she gave to some of them the name of *Aquaria*, were merely receptacles suspended in the waters of the bay to enable her to watch the habits of marine animals. The plan of maintaining the balance of nature by means of plants was unknown to her. To Dr. Johnson, an English naturalist, it appears, should be assigned the first practical application of the well-known theory, that the gaseous exhalations of animal and vegetable life mutually support each other. In 1842 he published a history of "British Sponges and Lithophytes," in which he says:—

"It is now about eight weeks ago since I placed in a small glass jar, containing about six ounces of pure sea-water, a tuft of the *Corallina officinalis*, to which were attached two or three minute *Confervæ*, and the very young frond of a green *Ulva*, while numerous *Rissoæ*, several little *Muscles* and *Annelides*, and a *Starfish*, were crawling amid the branches. The jar was placed on a table, and was seldom disturbed, though occasionally looked at; and at the end of four weeks the water was found to be still pure, the *Mollusca* and other animals all alive and active; the *Confervæ* had grown perceptibly, and the *Corallina* itself had thrown out some new shoots and several additional articulations." — *Gosse*, p. 7.

In our own country William Stimson, the collector and curator of the aquaria in the Smithsonian Institution at Washington, without any previous knowledge of Dr. Johnson's experiments in England, had, as early as the year 1849, made seven or eight small aquaria, which were perfectly successful; inasmuch as he kept some of them in a healthy condition for several months without change of water. He published no account of his success, not knowing that it was a

subject which was just beginning to awaken attention in England, and fated eventually to excite such universal interest. To him may safely be assigned the credit of having made the first systematic attempt at constructing an aquarium, although in all the works before us that honor is given to Mr. Robert Warrington, who in 1850 communicated to the Chemical Society of London a paper "On the Adjustments of the Relation between the Animal and Vegetable Kingdoms." He placed two gold-fishes in a glass jar, half filling it with water, and, putting sand, mud, and pebbles at the bottom, he planted a small *Vallisneria* in the earth, and left the whole undisturbed. After a time, the water became thick, and a coating of confervoid vegetation obscured the glass; but, on introducing water-snails, he found that they fed on the mass, and restored the water to a clear and healthy condition. Two years later, he commenced a marine aquarium, in which by perseverance he overcame the difficulties at first encountered. The red and the brown sea-weeds, with which he had experimented unsuccessfully, were exchanged for the green series, among which the *Ulva* or sea-lettuce is a genus which grows most readily. Both of these early tanks of Mr. Warrington are still preserved in a healthy condition. Mr. Gosse commenced his experiments about the same time. He says that he was not aware, until long afterwards, that any one else had proposed to effect the object which had been occupying his mind for some time. Mr. Gosse's success — less perfect than Mr. Warrington's — was published in the "Annals of Natural History" for October, 1852. He at length prepared an aquarium on a large scale, for the present magnificent exhibition in the gardens of the London Zoölogical Society.

By this brief sketch of the history of the aquarium it will be seen that it was no sudden discovery, but the growth of years; and that its present perfection is the result of many patient investigations, trials, and disappointments.

Mr. Gosse has given us the result of his experience in numerous volumes, some published in the highest style of art, illustrated with splendid chromoliths; others prepared in a cheaper manner, for the benefit of those who are not able to

purchase expensive books. If we could find fault with so agreeable a guide, we might remark that he appears to have taken a little advantage of the present furor for the aquarium to spin out his volumes,\* and make the most of his subject; but the old adage, "Make hay while the sun shines," it may have been hinted to him, would apply as well to the *Sargassum* and *Laminaria* of marine fields as to the *Graminæ* of the terrestrial world.

The imaginative author of "Ocean Gardens," Noel Humphreys, predicts a most wonderful future for the marine aquarium. "In its present form," he says, "it is only a toy; but the time will come when we shall have immense crystal-walled seas, covering acres of ground, like the crystal palaces of the present day, in which the whale, the shark, and other Titans of the deep, will disport themselves with their natural enemies, for the amusement and edification of man." When that time arrives, young America will not be behind the Old World in the race; but some enterprising Barnum will catch the sea-serpent, and imprison that king of the ocean,

"Whose monstrous circle girds the world."

An aquarium, as most of our readers are aware, is a tank, three sides of which are generally of glass, set in a wooden or iron frame, containing either fresh or salt water. Into this mimic pond or sea plants and animals are introduced, in proper proportions to maintain life. To imitate their native haunts, sand, pebbles, and rocks are so placed as to afford them shelter; and this crystal cage, ornamenting our drawing-rooms, will enable the most recluse lover of nature's works to study the habits of many wonderful creatures much more successfully than that enterprising French zoölogist could possibly have done, who some years ago, it was said, proposed to furnish himself with an India-rubber dress, suitable spectacles, and a breathing-tube, to walk on the bottom of the Mediterranean Sea. But although every one can understand at a glance the theory of the aquarium, and may fancy himself competent to assume the care of one, yet

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\* He has published six different works upon the aquarium, and on zoölogy as connected with it.

the inexperienced will soon discover that some knowledge of natural science is required, as well as great care and judgment. Perseverance, too, is another virtue which will doubtless be called into exercise before the experiment is entirely perfected. •

The great error of the young aquarian is overstocking the vessel with animal life, forgetting how much carbonic acid the animals throw off, and that so much oxygen as they require cannot be elaborated by a few plants in so small a space. It has been thought by those of experience, that one proportion of organic matter to one hundred and sixty of water maintains the equilibrium of nature. On account of the desire to have a tank appear well-filled, it has been found necessary to aerate most aquaria, for which purpose various devices have been contrived. All those in the Dublin Zoölogical Gardens are connected, by a tube, with a single pair of bellows; and from this, branches open into each. The passing of the air into the tanks has a very pleasing effect; and visitors are so fond of blowing the bellows, that the authorities of the garden have found it entirely unnecessary to employ any one to pump the air.

After a certain time, the glass of the aquarium will be obscured by the growth of *Confervæ*, whose minute spores are always floating about in air and water. To clear this off, water-snails in fresh, and periwinkles in salt water must be employed. These animals might properly be called mowers of the water-pastures, as they are provided with a peculiar apparatus which removes the superabundant herbage in a most artistic manner, leaving circular sweeps, like those of a mower in a field of grass. We cannot forbear quoting a graphic description of the periwinkle from one of the books under consideration.

“We see the familiar form of the periwinkle (*Littorina littorea*) marching soberly along beneath his massive mansion, stopping to munch the tender shoots of some *Alga*, or leisurely circumambulating the pretty tide-pool which he has chosen for his present residence. You may tell that all his movements are marked by gravity and deliberation, for if he does not let the grass grow under his feet (I beg his pardon, he has but one foot, though, as that is somewhat of the amplest,

he is not deficient in understanding), he lets it grow over his head. It is quite common to see one of these mollusks adorned with a goodly *Ulva* or other sea-weed that has taken root on the summit of his shell, so that he habitually sits under the shadow of his own roof-tree." — *Gosse*, p. 30.

Chemistry has succeeded in giving us artificial sea-water, which enables those living at a distance from the sea-shore to possess a marine aquarium. Papers of the requisite powder, or directions for preparing it, may be procured from the dealers in articles for the aquarium. Like good wine, it improves by age, but is totally unfit for animal life until weeds have been growing in it for several days, and even for months, if fishes and the higher order of Crustaceæ are desired.

"It must be understood that, where real sea-water can be easily obtained, as at spots near the coast, it is undoubtedly the best, though in some respects the artificial preparation is preferable, because less liable to certain eccentric changes of constitution, which will fall under our attention further on. Sea-water contains the spores of plants, and the germs of many forms of animal life, which may have development in the tank; and when these births occur, it is a special gratification to the possessor. But such germs may also decay and cause putrescence; and if a tank is neglected, the water is liable to get cloudy, the stones black, the sides of the vessel semi-opaque, and the animals diseased; . . . . but I here call attention to the fact, that artificial sea-water is much less liable to get out of condition from the very absence of organic matter, which on first reflection we should regard as a disadvantage." — *Hibberd*, p. 59.

There is one important fact which all aquarists must learn sooner or later, though they may not at first know the scientific reason for it, and will perhaps refer their success to mere chance. The pleasant writer of "*My Aquarium*," in the *Atlantic Monthly*, does not appear to know why her third attempt succeeded after two failures, although the fact of the presence of the Infusoria is distinctly stated. If we will only learn of nature, each stagnant pool in our country-walks may teach us that these lower forms of life are the scavengers of the water. Hibberd gives the reason of this in the following paragraph:—

"There is one feature which no writer on the aquarium has yet noticed; namely, when a tank is properly stocked, the water soon gets



crowded with infusorial animalculæ, which swarm among the plants and on the sides of the glass in countless thousands, visible only by the aid of the microscope. These are in accordance with a natural law; the presence of vegetable matter in water always induces them. But observe their value: they contribute to the sustenance of the smaller fishes, by supplying them with food; and, strangely enough, the researches of modern chemists have proved that these minute creatures respire in much the same way as plants. While all other animals absorb oxygen, and perish if the supply of that gas is withdrawn, these minute organisms absorb carbonic acid, and give out oxygen in abundance. This has been proved by Professor Liebig, who collected several jars of oxygen from tanks containing Infusoria only. Every one who has had experience in the management of tanks must have noticed that the water in a tank which has been established some months will sustain a much greater amount of animal life than one of the same dimensions but recently stocked. The presence of Infusoria in immense numbers is one of the reasons for this." — p. 9.

We cannot agree with Mr. Gosse in his opinion, that the vegetable kingdom is an appendage to the aquarium which must be tolerated on account of its use. To the eye of most persons, the soft green of the *Ulva*, and the delicate crimson tracery of the *Dasya* and *Delesseria*, are quite as beautiful as the fishes and mollusks which sport under their branches. A taste for gathering and arranging these lovely forms of nature has been prevalent of late years, and no one can deny that, when the delicate fronds of the sea-weeds are expanded and fastened upon paper, they form a more exquisite picture than any which the hand of man can make. Why, then, should we not admire them even more, spread out in their native element, where the grouping of graceful forms is more striking than that of the terrestrial flora? Viewed through a pocket microscope, these thread-like tissues become like the gemmed girdle of a queen, glittering in rich array with opals, emeralds, and rubies.

The "*inutilis alga*" of ancient classical writers has, in the march of modern science, been discovered to contain some of the most valuable properties used in medicine and the arts. From the manufacture of kelp alone, the islands of the Hebrides realized in one year the sum of one hundred and twenty thousand pounds. There are some species of *Alga* which in

many countries form an important article of food. The car-ragheen (*Chondrus crispus*), so abundant on our own coast, is made into palatable and nourishing food; and there are doubtless many more uses to which these weeds of the ocean will in time be applied.

The habits of marine animals, as described by those who have made that branch of zoölogy a study, seem almost like a fairy tale; but we feel sure that the increased facilities the aquarium affords for learning their habits, will reveal to us more wonders than are now dreamed of in our philosophy.

"The very jelly-fish," says Dr. Harvey, "as it swims the wave, expanding and contracting its umbrella, and thus propelling itself through the water, has its beauty. But few are aware of the singularity of its history; how its eggs are of the nature of seeds, which, sown on their rocky beds, sprout and grow, throwing out buds and suckers, each of which forms an animal stem quite unlike the parent jelly-fish, till at a certain time young jelly-fish begin to be formed, and to be thrown off by the several branches, just as flowers are formed and expand on the several branches that originate from a vegetable seed. And if the abject jelly-fish, whose body consists of little more than organized water, have a history so wonderful, shall we not expect to find, in tracing the history of other tribes of animals, matter of equal interest?"

The Actiniæ or sea-anemones, although belonging to the lowest order of animal life, are among the most beautiful denizens of the sea, and, when transferred to our parlor oceans, are their greatest ornament. The name of Anemone was bestowed upon this group from its resemblance to flowers; and even the botanical names of the pink, daisy, ice-plant, &c. have been added to that of Actiniæ, to designate the different species. They were at one time thought to belong to the vegetable world, and poets have apostrophized them as flowers of the sea; but alas! it is sad to take away the lovely character which the charms of poetry have woven around them, and to assert that they are now known as a most voracious and carnivorous group. They will snap at a bit of raw beef or mutton, and draw it into their mouths with great relish; and woe to the unwary inhabitants of the aquarium who swim too near their expanded tentacles. Firmly adher-

ing to its base, the anemone puts out its arms in quest of prey; and nothing once in contact with them can escape its deadly touch. It is furnished with weapons offensive and defensive, in the shape of highly elastic threads barbed at the extremity. These are ordinarily coiled up in oval capsules, but at the will of the animal are projected with surprising force. Dr. Johnson relates an anecdote of an *Actinia crassicornis* who swallowed a *Pecten*, a sharp-edged shell several times larger than itself, which so stretched the body as on a ring of wire, as virtually to cut it into two parts. Thereupon it put out from the base a new disc with mouth and tentacles, and became a double anemone, to which the gorged shell served as a base of attachment.

"The *Actiniæ*," says Rymer Jones, "although exceedingly voracious, will bear long fasting. They may be preserved alive for a whole year, or perhaps longer, in a vessel of sea-water, without any visible food; but when food is offered, one of them will devour a crab as large as a hen's egg, or two muscles in their shells. In a day or two, the shells are voided through their mouth, perfectly cleared of the soft parts which they contained."

But some authors do not approve of feeding anemones in the aquarium, and they will doubtless live without the aid of raw meat or fish, as the Esquimaux can, for an almost indefinite time; but, as Dr. Kane remarked of his Arctic friends that they showed the effects of abstinence, so it has been demonstrated of the *Actiniæ* that, though they will live in the tank, they will not grow without feeding. There is also another analogy to vegetables in their organization, inasmuch as they can be cut up like a potato, and each part will form a new and perfect whole. William Stimson tried the experiment of dividing a specimen of a rare species, which he wished to increase, into twenty pieces, each of which, in time, became a perfect animal, with all its organs fully developed.

The hydra, one of the lowest order of polypes, not, like the corals, fixed and stationary, but crawling about in search of prey, was observed by Trembley contending with another individual of the same species for an animal which each looked upon as a *bonne bouche* for his own separate enjoyment. Both had partially succeeded in swallowing it, when

the largest put an end to the dispute, by swallowing its opponent as well as the subject of contention. Trembley naturally regarded so tragical a termination of the affray as the end of the swallowed polype's existence; but he was mistaken. After the devourer and his captive had digested the prey between them, the latter was regurgitated safe and sound, and apparently none the worse for the imprisonment.

The starfish, or common five-finger, one of the family of the Asteriæ, has been found recently to have committed great havoc among the oyster-beds in New York Harbor. The loss has been estimated at many thousands of dollars, so that the proprietors have petitioned the State to remit the usual tax upon the beds; and they assert that, unless some way is found to check the ravages of these animals, the oyster is in danger of becoming extinct in that locality. The ancients believed that the starfish cunningly inserted one of its rays between the valves, and thus gradually destroyed its victim, as Oppian says:—

“ Sic struit insidias, sic subdola fraudes  
Stella marina parat, sed nullo adjuncta lapillo  
Nititur et pedibus scabris disjungit hiantes.”

But modern observation has determined that its mode of attack is very different. If the oyster is a large bivalve (one which would make the mouth of a crustacean epicure water), four or five Asteriæ attach themselves to it, and, waiting patiently until the mollusk opens his shell, intrude between the valves their stomachs, which first, for greater convenience, they turn inside out. A liquid is supposed to be secreted by the stomach, which acts as an opiate upon the oyster, who no longer possesses the power to close his doors against the intruder, and thus becomes an easy prey to these burglars of the deep. It is to be hoped that the true lovers of the delicious oyster, particularly those who are accustomed to study the habits of the Radiata in the aquarium, will devise some plan to enable the bivalve to retain peaceful possession of his own house until he is forcibly ejected for the benefit of the lords of creation.

The family to which these depredators belong possess and exert a power which was supposed formerly to be the exclu-

sive privilege of mankind,—that of self-mutilation and suicide. The books on the aquarium relate numerous instances where this has been observed. A sea-cucumber (Holothuria), which was placed in a jar of water for transportation, being made uncomfortable by the jolting of a cabriolet, actually ejected his stomach, turning it inside out, and then threw it off, together with his head and circle of tentacles. In this attenuated condition he still showed signs of life, and his owner hopes that the remedial powers of nature may yet be exerted to replace the missing organs.

The capture of a species of starfish, *Luida fragilissima*, which is remarkable for claiming the privilege of its race, is thus graphically described by the late lamented Professor Forbes :—

“The first time I ever caught one of these creatures, I succeeded in getting it into the boat entire. Never having seen one before, and quite unconscious of its suicidal powers, I spread it out on a rowing bench, the better to admire its form and color. On attempting to remove it for preservation, to my horror and disappointment I found only an assemblage of rejected members.

“My conservative endeavors were all neutralized by its destructive exertions, and it is now badly represented in my cabinet by an armless disc and a discless arm. Next time I went to dredge on the same spot, I determined not to be cheated out of a specimen in such a way a second time. I brought with me a bucket of cold fresh water, to which article starfishes have a great antipathy. As I expected, a *Luida* came up in the dredge, a most gorgeous specimen. As it does not generally break up before it is raised above the surface of the sea, cautiously and anxiously I sank my bucket to a level with the dredge’s mouth, and proceeded in the most gentle manner to introduce the *Luida* to the purer element. Whether the cold air was too much for him, or the sight of the bucket too terrific, I know not; but in a moment he proceeded to dissolve his corporation, and at every mesh of the dredge his fragments were seen escaping. In despair I grasped at the largest, and brought up the extremity of an arm with its terminating eye, the spinous eyelid of which opened and closed with something exceedingly like a wink of derision.” — *British Starfishes*, p. 138.

There is still a debatable ground between the animal and vegetable kingdom, which is occupied by the lowest organic forms; and, like depredators in the border raids of Scottish history, the botanist occasionally crosses the line and levies

black mail upon the zoölogist, who in his turn claims some hitherto recognized vegetable production as endowed with animal life. The sponges which, for the last dozen years, have been given to the vegetable kingdom, are now reclaimed by zoölogists. In his pleasant sketches of the Natural History of Tenby (a seaside resort in Wales), Mr. Gosse inclines to class them with the animal kingdom. He details his microscopic experiments on several species, and asserts that they undoubtedly possess those two criterions of animal existence, sensibility to touch and spontaneous movement. Yet we find these very qualities in some undoubted vegetable forms, as sensibility to touch in the leaves of the mimosa and the stamens of the barberry, and spontaneous movement in the remarkable *Dionæa muscipula* or Venus's fly-trap, and in that still more mysterious sleep of plants which we may any day observe, even before sunset, in the acacia, clover, wood-sorrel, and water-lily. This border land, which has of late years so puzzled learned men, is an excellent field in which the aquarian can exercise his skill, by the new means afforded of watching the constant habits and the metamorphoses of these lower forms of creation, and may eventually run a boundary line which will amicably settle all disputes between the two kingdoms.

Time would fail us to give even a glimpse of what these wonderful books reveal. We have a phalanx of authors, — Gosse, Sowerby, Humphreys, Lankester, and Hibberd on the Aquarium, Harvey's Seaside Book and Kingsley's Glaucus, all popular treatises, of which only one, the last mentioned, has been republished in this country. It is a noteworthy fact, that through each and all of them flows a most devout and reverential spirit. The crime which brought down the curse of Heaven upon the nations of antiquity, — that, knowing God in his works, they glorified him not as God, — cannot be imputed to these devotees, who truly "look through nature up to nature's God."

"Science and Religion," says Harvey, "must not be confounded. Each has her several paths, distinct but not hostile. Each in her way is friendly to man, and when both unite, they will ever be found to be his best protectors; the one a 'light to his eyes,' opening to him the

mysteries of the material universe; the other 'a lamp to his feet,' leading him to the immaterial, incorruptible, and eternal."

It is greatly to be wished that some one, who has made marine botany and zoölogy a study, would write a popular work concerning our own coast. The great desideratum is a handbook sufficiently easy for beginners, which would enable them to classify and name the objects of interest most generally found on the New England seaboard; for we all know, Shakespeare to the contrary notwithstanding, that a rose by any other name does not smell as sweet. Already the loungers at fashionable watering-places begin to be affected by the mania for marine explorations, it having been found that there is a more rapid way of consuming time at the sea-shore than in the smoke of cigars over yellow-paper novels. The great stumbling-block in the way of an American book appears to be the new and unclassified species, differing from the European forms, with which our waters abound; but still we think he who would give even a partial insight into that portion of the great Atlantic which beats upon the rocks of the various summer resorts in Massachusetts Bay, would bring his labor to an excellent work.

Now that a large portion of the American people are taking their annual hegira, forsaking comfortable city houses and suburban residences for the purpose of breathing the sea-air through the medium of fashionable first-class hotels, or the less aristocratic quarters of little coves and fishing towns, we would say to one and all, Commence an aquarium. If your sojourn at the sea-side is to be brief, or if you do not feel disposed to purchase one of the glass tanks of the dealers in aquarian wares,—a race which has recently sprung up "all along shore,"—take a wash-basin, a milk-pan, or a foot-bath, and you can improvise an aquarium that will occupy all your leisure moments, which are usually so many and hang with such leaden weight upon the scores of summer idlers, who, their daily bath and bowling over, look with dismay upon the weary hours which must intervene before they can again go through the same diurnal process. Those who seek the shore for health will find an object to keep them in the open air during fine weather, and, when a rainy day comes, a new resource

which will take the place of books, business, and home occupations, in studying the habits and watching the beauty of the specimens they have collected. Whoever has seen the forlorn faces of men, women, and children, drawn together without occupation in the common room of a sea-side boarding-house, during a rainy week, will bless the man who first invented the aquarium.

Let not the zealous aquarian go to his work with the high expectation that his feeble farthing candle will become a Pharos to the world. But as the lowest orders of marine organic life by congregating together light up the whole ocean with a phosphorescent glow, so systematic co-workers in this delightful pursuit will aid one another, and in time illumine the depths of the great sea itself with such a flood of knowledge that nothing can remain hidden beneath it.

We cannot better close this article than in the words of a celebrated writer:—

“In wonder all philosophy began, in wonder it all ends, and admiration fills up the interspace. But the first wonder is the offspring of ignorance, the last is the parent of adoration. The first is the birth-throe of our knowledge, the last its euthanasy and apotheosis.”

ART. VII.—1. *Practical Landscape Gardening, with Reference to the Improvement of Rural Residences, giving the General Principles of the Art; with full Directions for planting Shade Trees, Shrubbery, and Flowers, and Laying out of Grounds.* By G. M. KERN. Cincinnati: Moore, Wilstach, Keyes, & Co. 1855. pp. 328.

2. *Landscape Gardening; or Parks and Pleasure-Grounds. With Practical Notes on Country Residences, Villas, Public Parks, and Gardens.* By CHARLES J. SMITH, Garden Architect, etc. With Notes and Additions, by LEWIS F. ALLEN, Author of “Rural Architecture,” &c. New York: C. M. Saxton. 1853.

SINCE the publication, in 1849, of Mr. Downing’s treatise on Landscape Gardening and Rural Architecture, no work